

# *Proposed Wireless Telecommunications Facility*

Pine Grove Cemetery  
940 Meriden Road  
Waterbury, Connecticut

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## Visual Resource Evaluation

Optasite, Inc. seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need to construct a wireless telecommunications facility (Facility") to be located within the City of Waterbury, Connecticut. This "Visual Resource Evaluation" was conducted to approximate the visibility of the proposed Facility within a two-mile radius of the Site ("Study Area").

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## Project Introduction

The proposed Facility includes the construction of a 110-foot tall monopole with two antenna arrays and associated ground equipment to be located within a fenced enclosure at the base of the tower. Based on information provided by the project engineer, Clough Harbour & Associates, the proposed project area is located at approximately 611 feet Above Mean Sea Level (AMSL). Access to the proposed Facility would be provided via a proposed gravel access drive that would extend to the proposed compound in a northerly direction from an existing parking area accessible from Meriden Road.

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## Site Description and Setting

The proposed Facility is situated on a wooded, undeveloped portion of property located at 940 Meriden Avenue ("host property") in the City of Waterbury, Connecticut. Identified in the City of Waterbury Tax Assessors records as Map 0302/Block 0377/Lot 0070, the host property consists of approximately 104 acres of land and is currently occupied by the Pine Grove Cemetery and an associated maintenance building located roughly 150 feet southeast of the proposed site (see Photolog Documentation map contained in Attachment A). Land use within the general vicinity of the host property is comprised of medium-density residential parcels and roadside commercial developments. Segments of the Interstate 84 transportation corridor traverse the Study Area. In total, the Study Area contains roughly 140 linear miles of roadways.

The topography in the Study Area is generally characterized by rolling hills that range in ground elevation from approximately 368 feet AMSL to approximately 800 feet AMSL. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species. The tree canopy occupies approximately 3,808 acres of the 8,042-acre study area (47%). During the in-field activities associated with this analysis, an infrared laser range finder was used to accurately determine the average tree canopy height throughout the Study Area. Numerous trees were selected for measurement and the average tree canopy established, in this case 50 feet. In total, the Study Area features approximately 65 acres of surface water.

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## METHODOLOGY

To estimate the visibility associated with the proposed Facility, VHB incorporates a two-fold approach utilizing both a predictive computer model and in-field analysis. The predictive model is employed to assess potential visibility throughout the entire Study Area, including private property and/or otherwise inaccessible areas for field verification. A crane test and Study Area drive-through reconnaissance are also conducted to obtain locational and height representations, back-check the initial computer model results and provide photographic documentation from publicly accessible areas. Results of both activities are analyzed and incorporated into the final viewshed map. A description of the methodologies used in the analysis is provided below.

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### Visibility Analysis

Using ESRI's ArcView® Spatial Analyst, a computer modeling tool, the areas from where the proposed Facility is expected to be visible are calculated. This is based on information entered into the computer model, including Facility height, its ground elevation, the surrounding topography, existing vegetation and any significant structures/objects that may act to obstruct potential views. Data incorporated in the model includes 7.5 minute digital elevation models (DEMs) and a digital forest layer for the Study Area. The DEMs were produced by the United States Geological Survey (USGS) in 1982 at a 30 meter resolution. The forest layer was derived through on-screen digitizing in ArcView® GIS from 2004 digital orthophotos with a 0.5-foot pixel resolution.

Once the data are entered, a series of constraints are applied to the computer model to achieve an estimate of where the Facility will be visible. Initially, only topography was used as a visual constraint; the tree canopy is omitted to evaluate all areas of potential visibility without any vegetative screening. Although this is an overly conservative prediction, the initial omission of these layers provides a reference for comparison once the tree canopy is established and also assists in the evaluation of potential seasonal visibility of the proposed Facility. A conservative tree canopy height of less than 50 feet is then used to prepare a preliminary viewshed map for use during the Study Area reconnaissance. The forested areas within the Study Area were then overlaid on the DEM with the measured tree height of 50 feet added and the visibility calculated for the final viewshed map. The forested areas are then extracted from the areas of visibility, with the assumption that a person standing among the trees will not be able to view the Facility beyond a distance of approximately 500 feet. Depending on the density of the vegetation in these areas, it is assumed that some locations within this range will provide visibility of at least portions of the Facility based on where one is standing. Lastly, this analysis was conducted in 28-foot increments from 110 feet down to 26 feet and the results consolidated into a single thematic layer in order to determine the approximate amount of the tower structure that would be visible from any given location.



Also included on the map is a data layer, obtained from the Connecticut State Department of Environmental Protection (CTDEP), which depicts various land and water resources such as state parks and forests, recreational facilities, dedicated open space and CTDEP boat launches among other categories. This layer is useful in identifying potential visual impacts to any sensitive receptors that may be located within the Study Area. Lastly, based on a review of available data published by the Connecticut Department of Transportation and discussions with staff in Waterbury, Wolcott, Cheshire and Prospect, it was determined that there are no state or locally designated scenic roadways contained within the Study Area.

A preliminary viewshed map is generated for use during the in-field activity in order to confirm that no significant land use changes have occurred since the 2004 aerial photographs used in this analysis were produced and to verify the results of the model in comparison to the crane test. Information obtained during the reconnaissance is then incorporated into the final visibility map.

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### **Crane Test and Study Area Reconnaissance**

On July 6, 2006 Vanasse Hangen Brustlin Inc., (VHB) observed a crane test at the proposed Facility in order to evaluate the potential viewshed within the Study Area. The crane test consisted of raising and maintaining a crane arm adjacent to the proposed Site location to a height of 120 feet (the proposed height at that time). Once the crane arm was erected, VHB personnel drove the public road system in the Study Area to inventory those areas where the crane arm was visible. During the crane test, weather conditions were sunny. The temperature was approximately 85 degrees.

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### **Photographic Documentation**

During the crane test, VHB staff conducted a drive-by reconnaissance along the roads located within the Study Area with an emphasis on nearby residential areas and other potential sensitive receptors in order to evaluate and refine the results of the preliminary viewshed map and to verify where the crane arm was, and was not, visible above and/or through the tree canopy. The crane was photographed from a number of different vantage points to document the actual view towards the proposed Facility. The locations and orientations of the photos are described below:

1. View from Courtland Avenue at Beth Lane, looking south (crane arm is visible through the trees).
2. View from Meriden Road at entrance to Pine Grove Cemetery (Host Property), looking west.
3. View from Meriden Road east of Woodtick Road, looking east.
4. View from Meriden Road at Woodland Avenue, looking east.

Photographs of the crane arm from the view points listed above were taken with a Nikon Digital Camera COOLPIX 5700, which has a lens focal length equivalent to a 35 mm camera with a 38 to 115 mm zoom. "The lens that most closely approximates the view of the unaided human eye is known as the normal focal-length lens. For the 35 mm camera format, which gives a 24x36 mm image, the normal focal length is about 50 mm." The optical zoom lens for the Nikon COOLPIX was set at a range of 50 mm to 70 mm for the purposes of this Visual Resource Evaluation.

The locations of the photographic points are recorded in the field using a hand held GPS receiver and are subsequently plotted on the maps contained in the attachments to this document.

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## Photographic Simulation

Photographic Simulations were generated for the four locations identified above. The Photographic Simulations represent a scaled depiction of the proposed monopole from these locations. The height of the Facility is determined based on the location of the crane arm in the photographs and a proportional monopole image is simulated into the photographs. The photographic simulations were appropriately scaled down (due to the crane test height of 120 feet AGL) to reflect the proposed tower height of 110 feet AGL. The simulations are contained in Attachment B.

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## CONCLUSIONS

Based on this analysis, areas from where the proposed 110-foot monopole would be visible above the tree canopy comprise approximately 33 acres, or less than one half of one percent of the 8,042 acre Study Area. Much of the anticipated year-round visibility depicted on the viewshed map is confined to the host property and select portions of Meriden Road, respectively  $\pm 9$  acres and  $\pm 17$  acres, of the 33 acre total. Other areas of visibility are identified north of Meriden adjacent to the Pine Grove Cemetery entrance; south of the proposed Facility at the Calvary Cemetery; and several smaller areas located on private properties within the Study Area. VHB estimates that approximately 8 residences within the Study Area will have partial year round views of the proposed monopole above the existing tree line. The existing tree cover and other vegetative screening found within the Study Area serve to minimize the visual effects of the proposed monopole. The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views through the trees are anticipated. These areas comprise approximately 91 additional acres and are mostly limited to the host property and areas approximately 0.50 mile to the north. Seasonal views are also anticipated east of the proposed Facility along Decicco Road. Although the anticipated seasonal visibility extends to several nearby residential areas,

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<sup>1</sup> Warren, Bruce. *Photography*, West Publishing Company, Eagan, MN, c. 1993, (page 70).

potential views are expected to be minimal as the surrounding tree cover would provide significant screening, even during leaf-off conditions. In total, VHB anticipates that approximately 36 residences will achieve seasonal views of the proposed Facility from select portions of their respective properties.

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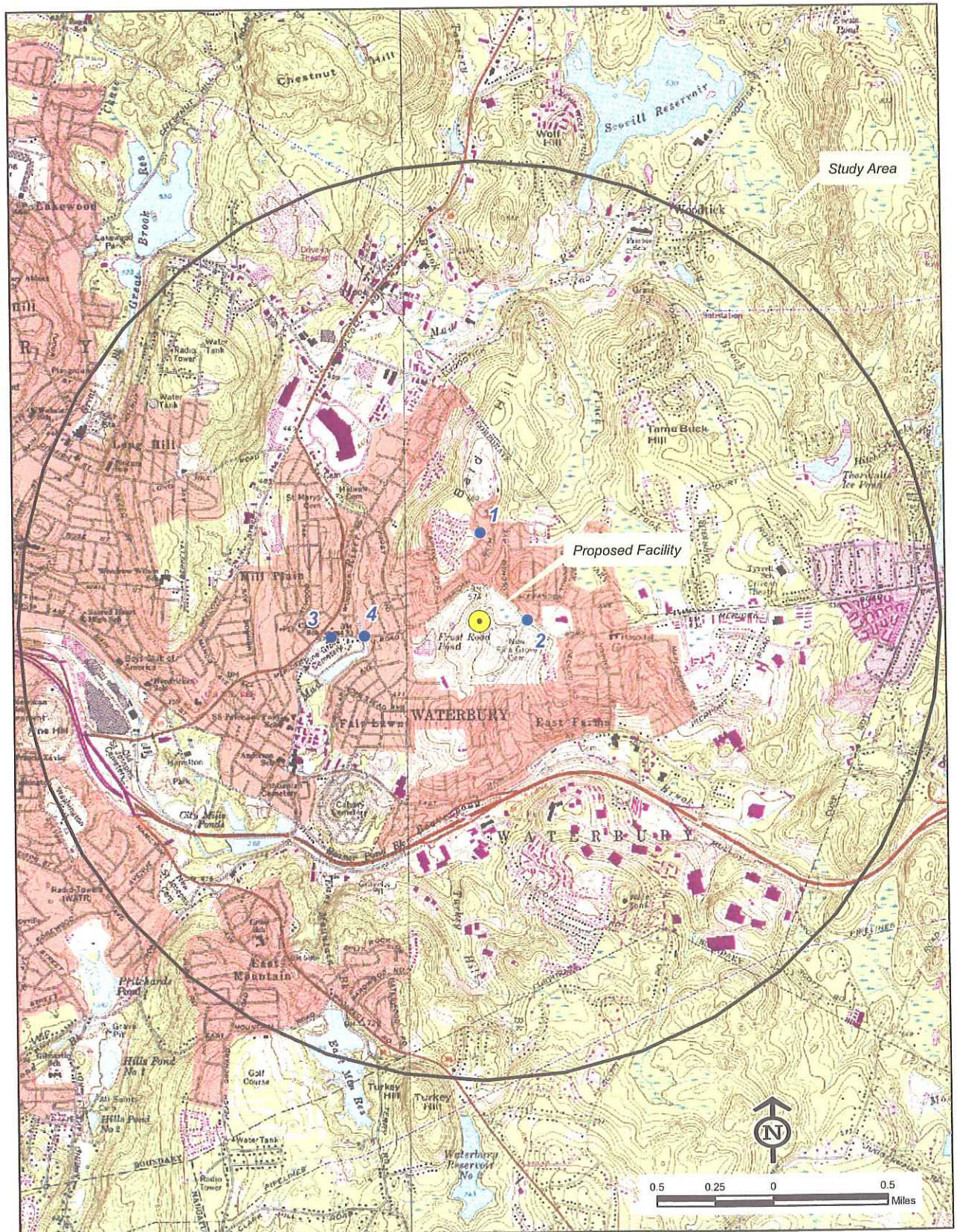
## Attachment A

# Photolog Documentation Map, Crane Arm Photographs and Photographic Simulations



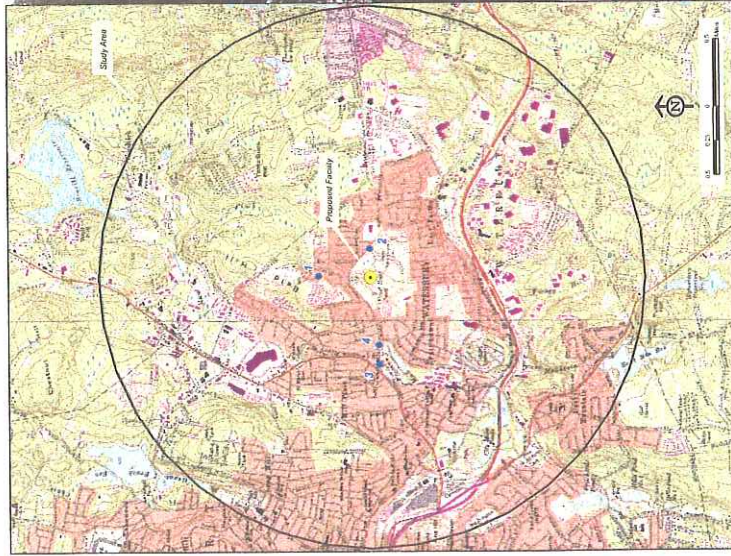
# Photolog Documentation

City of  
**Waterbury**  
Connecticut





## Photographic Documentation and Simulation View 1



940 Meriden Road  
Waterbury, CT  
CT-999-0096

Monopole with two  
carriers

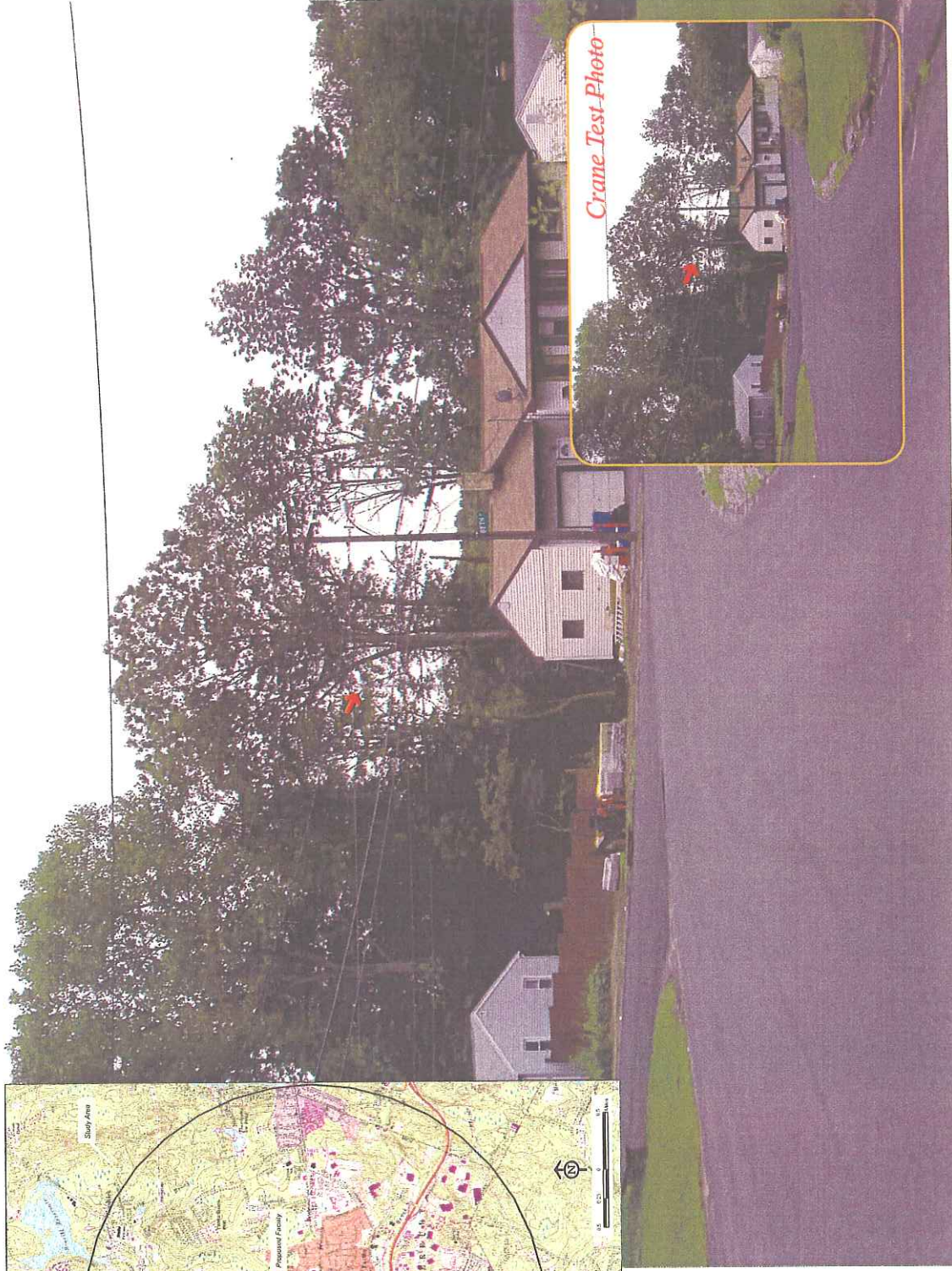
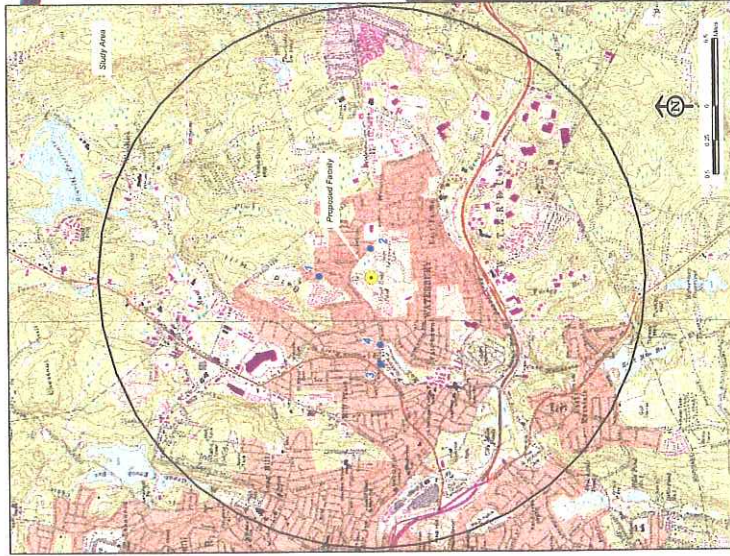


PHOTO TAKEN FROM COURTLAND AVENUE AT BETH LANE, LOOKING SOUTH (CRANE ARM IS VISIBLE THROUGH TREES)  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.39 MILE +/-



## Photographic Documentation and Simulation View 2



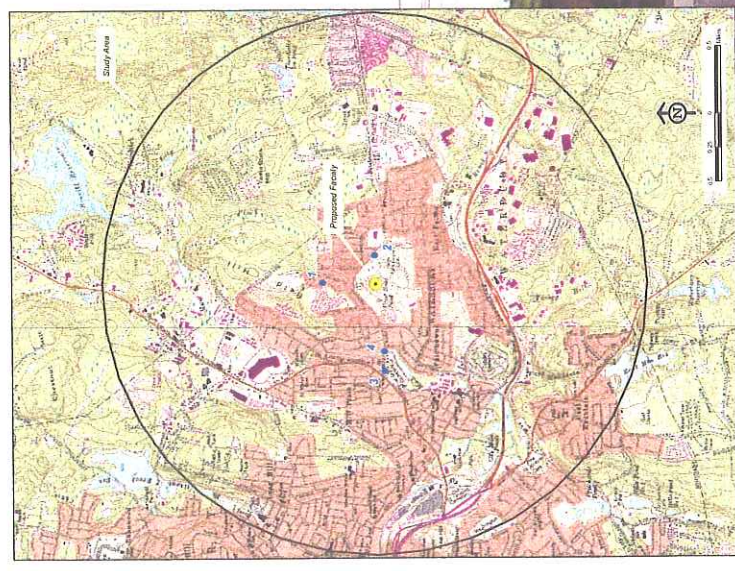
940 Meriden Road  
Waterbury, CT  
CT-999-0096

Monopole with two  
carriers



PHOTO TAKEN FROM MERIDEN ROAD AT ENTRANCE TO PINE GROVE CEMETERY (HOST PROPERTY), LOOKING WEST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.19 MILE +/-





940 Meriden Road  
Waterbury, CT  
CT-999-0096

Monopole with two  
carriers

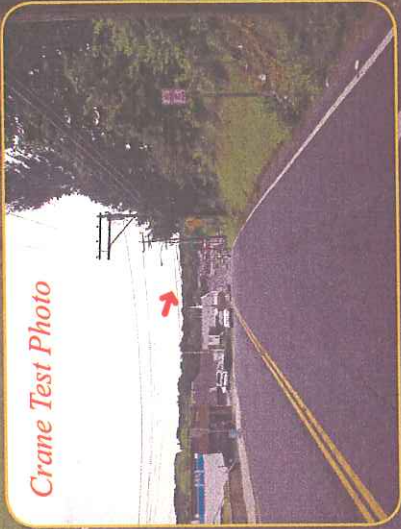
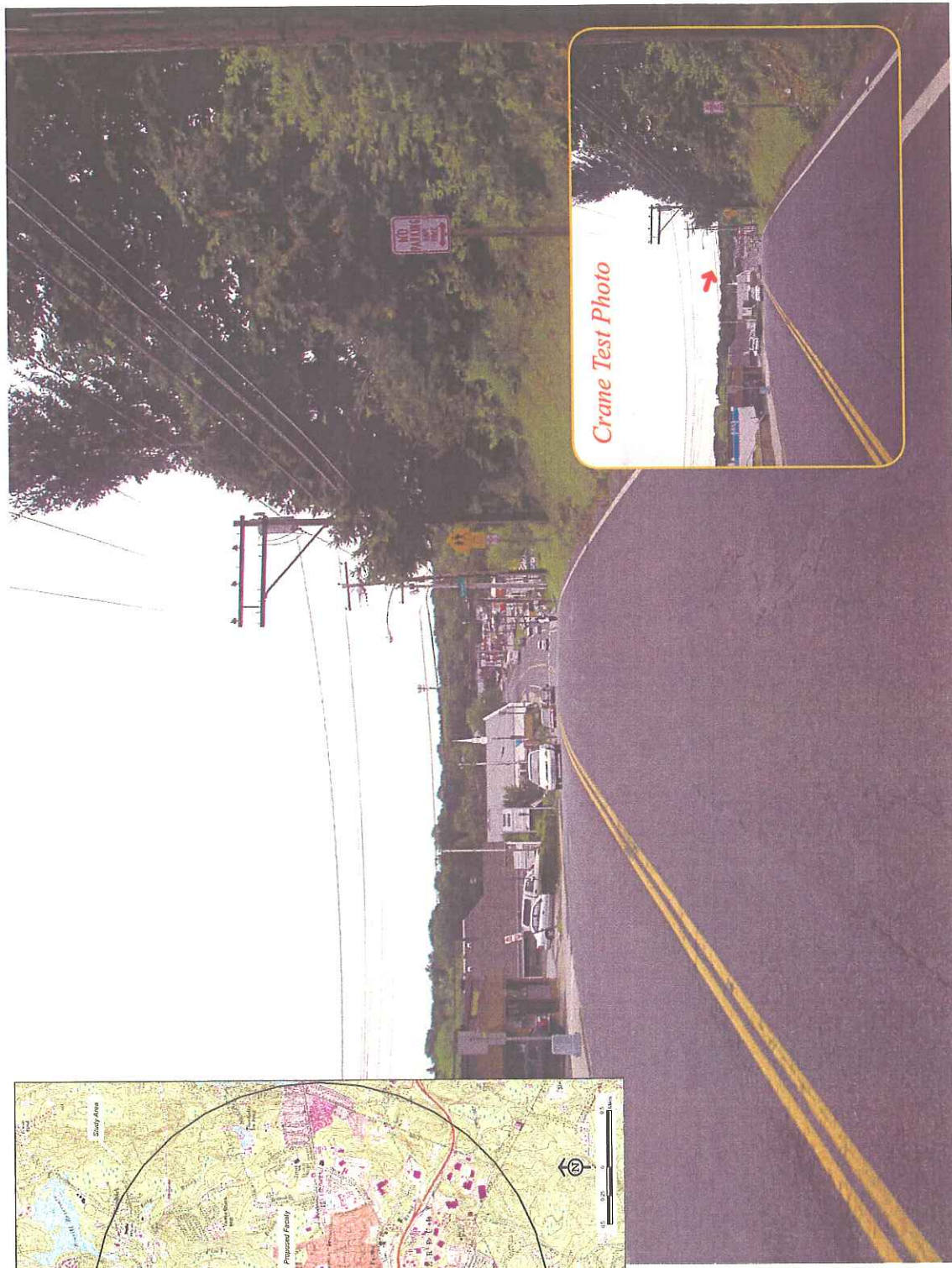
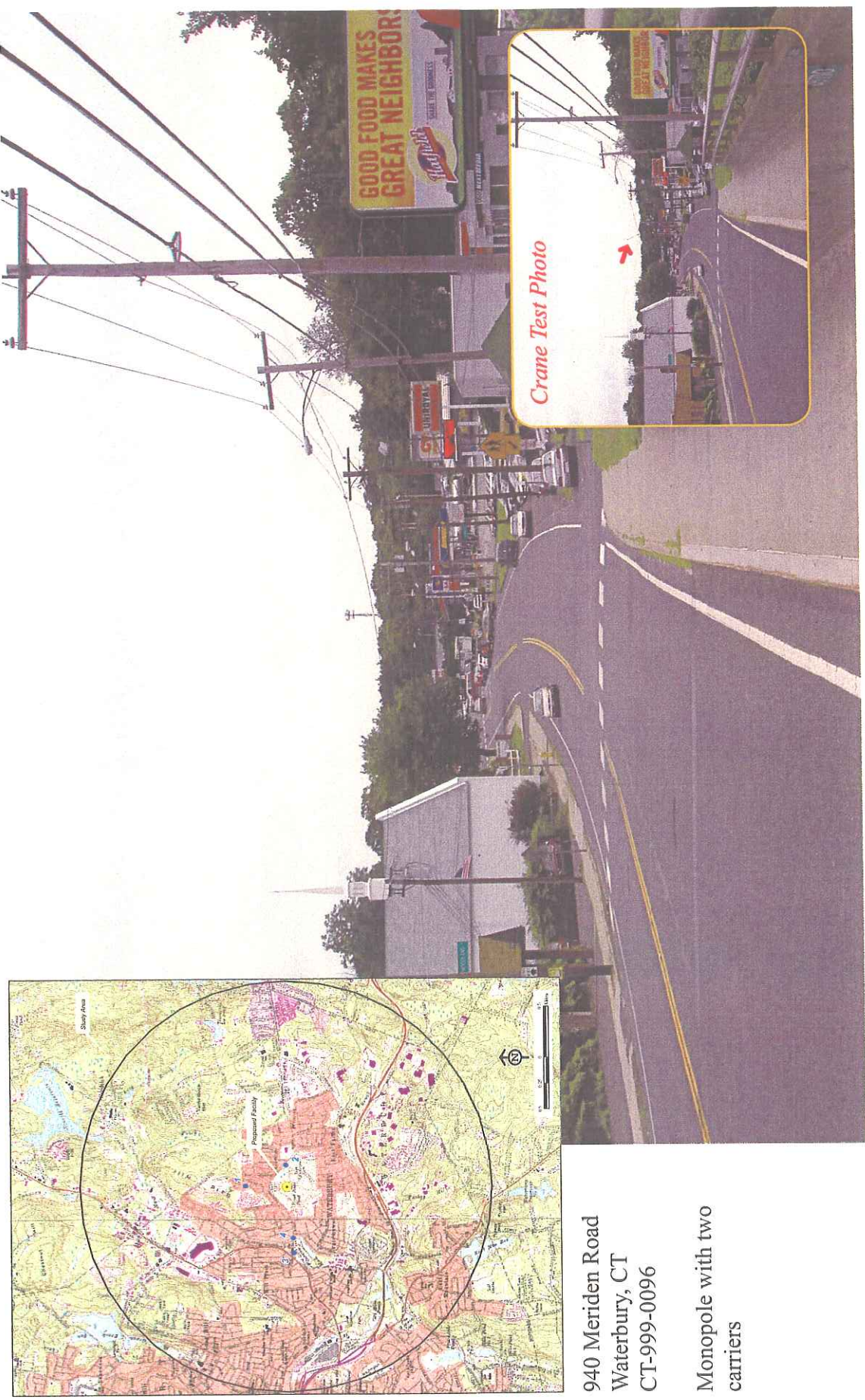


PHOTO TAKEN FROM MERIDEN ROAD EAST OF WOODTICK ROAD, LOOKING EAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.63 MILE +/-





940 Meriden Road  
Waterbury, CT  
CT-999-0096

Monopole with two  
carriers

PHOTO TAKEN FROM MERIDEN ROAD AT WOODLAND AVENUE ROAD, LOOKING EAST  
DISTANCE FROM THE PHOTOGRAPH LOCATION TO THE PROPOSED SITE IS 0.51 MILE +/-



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# Attachment B

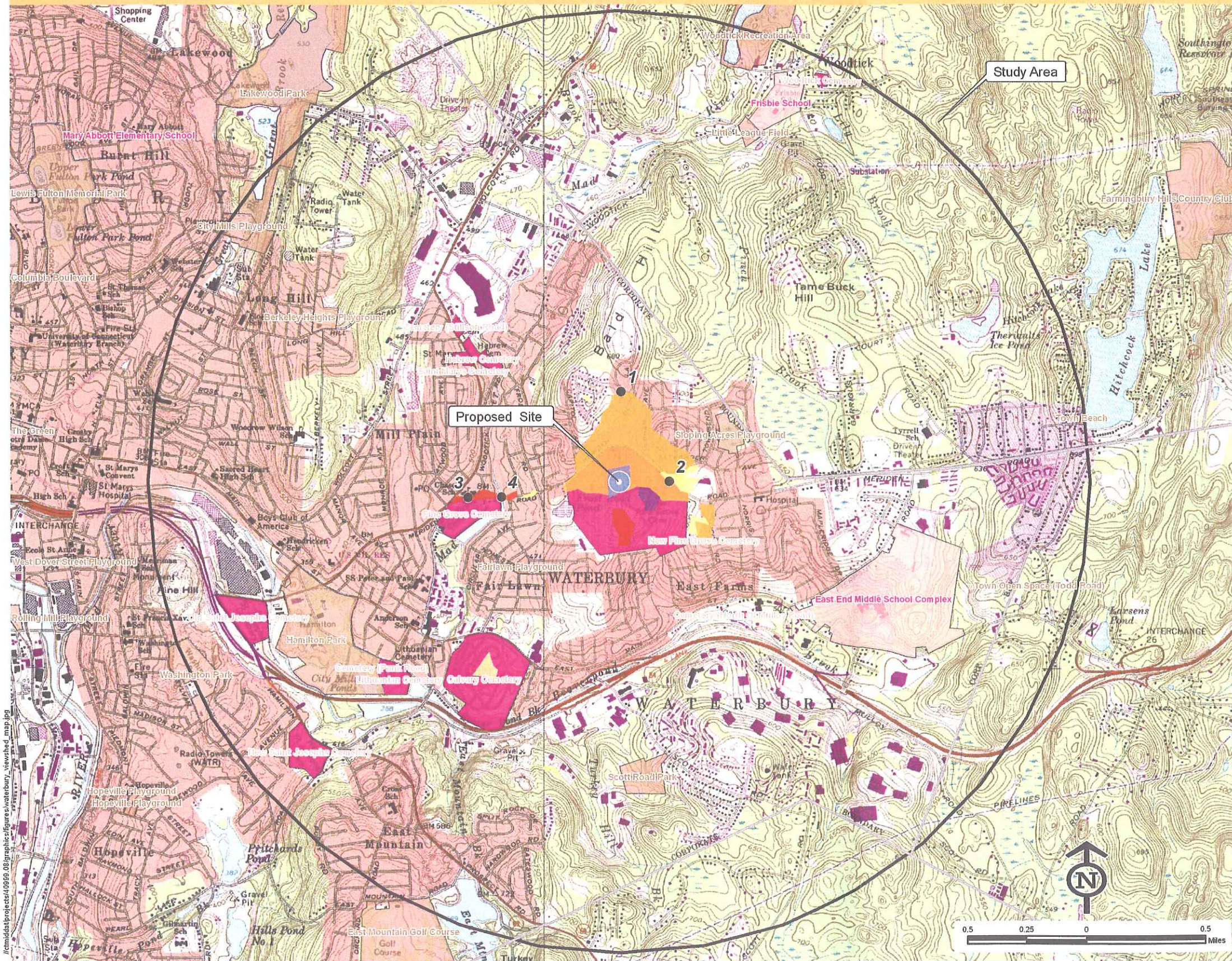
## Viewshed Map



# Viewshed Map

## Topography and Forest Cover as Constraints

City of  
Waterbury  
Connecticut



### Proposed Telecommunications Facility Pine Grove Cemetery 940 Meriden Road Waterbury, Connecticut

#### NOTE:

- Viewshed analysis conducted using ESRI's Spatial Analyst.
- Proposed Facility height is 110 feet.
- Existing tree canopy height estimated at 50 feet.

#### DATA SOURCES:

- 7.5 minute digital elevation model (DEM) with 30 meter resolution produced by the USGS, 1982
- Forest areas derived from 2004 digital orthophotos with 0.5-foot pixel resolution; digitized by VHB, 2006
- Base map comprised of Southington and Waterbury USGS Quadrangle Maps
- Protected properties data layer provided CTDEP, 2003
- Scenic Roads layer derived from available State and Local listings.

Map Compiled August 2006

#### Legend

- Proposed Monopole Location (Includes area of visibility approximately 500 feet around facility)
- Photos - August 9, 2006
- Crane arm visible above the trees
- Anticipated Seasonal Visibility (Approximately 91 Acres)
- Approx. % of Monopole Visible (Year-Round)
  - Upper 25% to Tree Line
  - 50%
  - 75%
  - Entire Facility Visible
- Total Year-Round Visibility Approximately 33 Acres
- Protected Properties (Municipal)
  - Cemetery
  - Preservation
  - Conservation
  - Existing Preserved Open Space
  - Recreation
  - General Recreation
  - School
  - Uncategorized
- Protected Properties (CT DEP)
  - State Forest
  - State Park
  - DEP Owned Waterbody
  - State Park Scenic Reserve
  - Historic Preserve
  - Natural Area Preserve
  - Fish Hatchery
  - Flood Control
  - Other
  - State Park Trail
  - Water Access
  - Wildlife Area
  - Wildlife Sanctuary
- DEP Boat Launches
- Scenic Road (State and Local)
- Town Line
- Protected Properties (Federal)